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### Chemical Weed Control in Sorghum : 1983

Cooperative Extension South Dakota State University

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# CHEMICAL WEED CONTROL IN SORGHUM: 1983

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Herbicides are a supplement to and not a replacement for crop rotations, proper seedbed preparation, cultivation, and crop competition.

Sorghum grows slowly the first few weeks after emerging. Weed competition at this time can reduce yields 25% or more. Most annual grasses are less serious in sorghum planted after mid-June.

Proper tillage immediately before planting kills emerged weeds and prevents them from getting a head start on the crop. A rotary hoe or flextime harrow is useful when the crop is small.

Perennial weeds are difficult to control with cultivation. An integrated program of crop rotation, cultivation, and herbicides is most effective.

## HERBICIDE SUGGESTIONS

Information in this publication is based on South Dakota Agricultural Experiment Station research and other research or observations. Herbicides are included only after the chemical is registered by the Environmental Protection Agency (EPA) as to residue tolerances in crops used for food or feed.

This information does not imply a guarantee or a responsibility for results. The use of trade names is for reader convenience and does not imply product endorsement. Every effort has been made to avoid mechanical error in preparation of this publication. The label should be considered the final guide. Users are responsible for following all label directions and precautions.

**WEED PROBLEMS.** Weeds are grouped as small-seeded annual broadleaves (kochia, lambsquarters, pigweed, etc.), large-seeded annual broadleaves (sunflower, cocklebur, etc.), annual grasses (green or yellow foxtail), or perennial weeds (field bindweed, Canada thistle, etc.). Control is rated poor, fair, good, very good, or excellent for each category of weeds.

**HERBICIDES.** Herbicides are listed by trade-name, with common name in parenthesis. Only the common name is used when the same active ingredient is available in several products.

Treatments listed under "Sorghum Herbicides" are those considered to be promising for most situations in South Dakota. Those listed under "Other Sorghum Herbicides" may be useful for special weed problems, have not been adequately tested, or have given less consistent results.

**RATES.** Rates for each treatment and each formulation are stated as the amount of product per acre. The common name and amount of active ingredient are used when referring to combinations. All rates are on a broadcast basis; adjust accordingly for band application.

**TIME TO APPLY.** Herbicide may be applied:  
Preplant Incorporated - before the crop is planted, and incorporated as directed.

Shallow Preplant Incorporated - preplant incorporated, but herbicide usually restricted to the top 2 inches of soil with single-pass incorporation.

Preemergence - after planting but before crop or weeds emerge.

Postemergence - after the crop or weeds have emerged.

## BAND VS. BROADCAST

One cultivation is usually needed with broadcast application. Banding reduced the cost per acre and usually replaces one or two row cultivations. Adjust broadcast rates for banding. A 12- to 14-inch band is suggested for top planting; a 7-inch band is suggested for most deep furrow or lister-planted crops.

## REDUCED TILLAGE SYSTEMS

### FURROW and TOP-PLANT

Additional crop residue on the surface may distort the spray pattern or intercept some of the herbicide, reducing weed control. Using the maximum rate for the soil type will partially compensate; however, do not exceed labeled rate. Heavy residue should be worked into the soil before broadcasting soil-applied treatments. Devices to move residue from the row area will improve results for band application.

Do not use preplant incorporated treatments with deep furrow or lister planting, as treated soil is moved from the row area. For these systems, limit band width of preemergence herbicides to the width of furrow bottom. Check herbicide label for restrictions on furrow planted crops.

## IRRIGATED SORGHUM

SDSU herbicide performance data are based primarily on dryland tests with limited observations under irrigation. Early season weed control is similar; except overhead irrigation improves results with preemergence herbicides if rainfall is not received before weeds emerge.

Late season weed control is much more critical than on dryland.

Irrigators should:

1. Apply  $\frac{1}{2}$  inch of water with overhead irrigation within 5 days of planting if rainfall is inadequate to activate preemergence treatments.
2. Use maximum rate for soil type.
3. Choose treatments that have maximum residual activity for the rotation to improve late season control.
4. Use combination soil applied treatments to control small-seeded annual broadleaves.



## Herbicide Cost

5. Use preplant incorporated treatments for furrow irrigation. The herbicide layer is disturbed when furrows are formed. Preplant incorporated treatments may give slightly better control than preemergence treatments in this situation.

The table below gives the cost per acre for several herbicide treatments, based on suggested retail prices for the previous season. The amounts shown are for the low and high rate. Consult your local dealer for actual cost.

## Abbreviations Used

pt	= pint
qt	= quart
gal	= gallon
lb	= pound
lb/A acid equiv	= pound per acre acid equivalent
lb/gal	= pound per gallon (active ingredient or acid equivalent)
wp	= wettable powder
wdg	= water dispersible granule (spray)
gran	= granule

HERBICIDE	AMT/A	HERBICIDE COST/A
Ramrod	4-5 qt	\$ 15.00-18.75
Ramrod + atrazine	2-4 qt+1-1½ pt	10.40-19.30
Ramrod + Modown	2½-4 qt+3-4 pt	18.60-27.25
Dual	1½-2½ pt	8.80-14.60
Dual + atrazine	1½-2 pt+1-1½ qt	11.70-16.00
Lasso	2½-4 qt	11.00-19.50
Lasso + atrazine	2-3 qt+3/4-1 3/4 qt	11.90-19.70
atrazine + oil	1½ qt	4.85
2,4-D (4 lb)	1 pt	1.10
Banvel (4 lb)	½ pt	2.75
Ramrod + Bladex	4 qt+2 lb	21.80

## FOLLOW THE LABEL

Federal regulations make it unlawful for any person to use an herbicide in a manner inconsistent with its labeling. This includes the kind of crop and weed; rate, carrier and other application directions; storage, disposal and protective clothing; or other precautions stated.

## SORGHUM HERBICIDES

## RAMROD (PROPACHLOR)

4-5 qt Ramrod-4 lb/gal or 20-25 lb Ramrod-20% gran (broadcast)

Grain sorghum. Very good to excellent control of several annual grasses. Not for broadleaves. Excellent crop tolerance. Better crop tolerance than most other herbicides on lighter soils. Most consistent preemergence treatment for annual grasses in limited rainfall areas. Has 2-3 weeks shorter residual than Dual or Lasso. Late weed may emerge in wet seasons or under irrigation.

Granule or flowable formulations are easier to handle and are less irritating than wettable powder. Granules and spray are equally effective. Granules are applied to the soil surface behind the press wheel. Rates of 4-5 lb/A active propachlor have been satisfactory in most SDSU tests. Lower rate is for light, low organic matter soils. Spray formulations may be applied in liquid fertilizer. Minimum carrier is 20 gpa (15 gpa for Ramrod liquid) for sprays. Ramrod liquid may be applied by air using minimum of 5 gpa carrier. No carryover. Do not graze or feed forage to dairy cattle.

**PREEMERGENCE.** Requires 1/3 to 3/4 inch rain within one week after application. Use shallow harrowing or rotary hoe if weeds emerge before rainfall is received. Travel the same direction as rows if banded.

Apply in a narrow band the width of furrow bottom for lister planted sorghum. Use shallow incorporation in top 2 inches of soil for furrow irrigated sorghum.



## SORGHUM HERBICIDES (CONTINUED)

### RAMROD + ATRAZINE (PROPACHLOR + ATRAZINE)

#### RAMROD/ATRAZINE

2½-4 qt Ramrod-4 lb/gal or + 1-1½ qt atrazine-4 lb/gal or 1½-2 lb atrazine-80% wp

5-8 lb Ramrod/atrazine-48% + 21%

Grain sorghum. Tank-mix or use commercial premix containing 48% propachlor + 21% atrazine. Very good to excellent control of several annual grasses and very good control of several small-seeded annual broadleaves. Limited control of large-seeded annual broadleaves such as sunflower. Consistent performance if rainfall received. Gives 2-3 weeks shorter residual for grass control than Dual + atrazine, but requires slightly less rainfall for activation. Better late season annual broadleaf control than propachlor + Bladex combination. Good broad spectrum, preemergence choice in low rainfall areas if carryover does not interfere with rotation. Excellent crop tolerance to propachlor; fair tolerance to lower atrazine rate in this combination. Crop injury may occur under cool, wet conditions or on alkaline or calcareous soils, or with high rates. Do not use on sandy, low organic matter soils.

Rates of 4 (propachlor) + 1 (atrazine) lb/A active have been satisfactory in most SDSU tests on heavy soils. Tank-mix preferred because it allows the flexibility to use low atrazine rate to minimize carryover. Liquid propachlor formulations are easier to handle and are less irritating than wettable powder. Preemergence applications may be made in liquid fertilizer. Minimum carrier is 20 gpa (15 gpa for Ramrod liquid). Ramrod liquid is labeled for aerial application in minimum of 5 gpa carrier. Do not graze or feed forage to dairy cattle. Refer to atrazine section for carryover crop limitations.

PREEMERGENCE. Preferred method. Same as for Ramrod or Bexton alone.

EARLY POSTEMERGENCE. Combinations with Bexton liquid or Ramrod wp may be applied after crop emergence until weeds have 2 leaves. Less consistent results. Do not apply in liquid fertilizer. Harrow or rotary hoe to remove emerged weeds.

### RAMROD + MODOWN (PROPACHLOR + BIFENOX)

2½-4 qt Ramrod-4 lb/gal + 2 lb Modown-80% wp or 3-4 pt Modown-4 lb/gal

Grain sorghum. Tank-mix. Good control of several annual grasses. Very good to excellent control of pigweed and fair to good control of kochia and lambsquarters. Consistent performance; however early rainfall critical. Good preemergence combination treatment where pigweed is the major broadleaf problem and carryover must be avoided. Very good crop tolerance. Less sensitive to soil variation than other combination treatments. Use higher rate for heavy weed infestations on heavy soil. Rates of 4 lb (propachlor) + 1.6 (bifenox) lb/A active are suggested for most soils. Liquid propachlor formulations are less irritating to handle. Ground application in water carrier. Do not graze or feed forage to dairy cattle.

PREEMERGENCE. Same as for Ramrod alone. Do not incorporate.

### DUAL (METOLACHLOR)

1½-2½ pt Dual-8 lb/gal

Grain sorghum treated with Concep (safener). Very good control of several annual grasses. Fair on pigweed; does not control most other broadleaves. Consistent results if rainfall or soil moisture requirements are met. Longer control than with propachlor. Tests indicate very good crop tolerance when using treated seed. Severe stand reduction when untreated seed is used. Seed must be treated with Concep (safener) by the seed company. Lower rates are for light, low organic matter soils. Rates of 2-2½ pt/A have been satisfactory in SDSU tests on heavy soils. May be applied in liquid fertilizer. Minimum carrier is 10 gpa for ground or 2 gpa for air. No carryover.

SHALLOW PREPLANT INCORPORATED. Usually more consistent than preemergence applications in major sorghum area. Incorporate into top 2 inches of soil with a field cultivator, shallow disk, multiweeder, or other suitable equipment during final seedbed operation. Deeper incorporation will reduce control. Will improve results when rainfall is very limited but gives slightly less control than preemergence application with adequate rainfall.

PREEMERGENCE. Must have ½ to ¾ inch of rain within one week after application. Rainfall requirement slightly higher than for propachlor. Use harrow or rotary hoe if weeds emerge before rainfall received.



## SORGHUM HERBICIDES (CONTINUED)

### LASSO (ALACHLOR)

2½-3½ qt Lasso-4 lb/gal

Grain sorghum treated with fluorozole (Screen) safener. Very good control of several annual grasses. Fair on pigweed, does not control most other broadleaves. Results consistent if rainfall is adequate. Somewhat longer control than for propachlor. Tests indicate very good crop tolerance when using treated seed. Severe stand reduction with untreated seed. Seed must be treated with safener by the seed company. Lower rates are for light, low organic matter soils. May be applied in liquid fertilizer. Minimum carrier is 15 gpa for ground and 5 gpa for air. No carryover.

SHALLOW PREPLANT INCORPORATED. Incorporate into the top 1 to 2 inches of soil with a field cultivator, multiweeder, or other suitable equipment. Deep incorporation reduces control.

PREEMERGENCE. Must have 1/2 to 3/4 inch of rainfall before weed emergence. Rainfall requirement slightly higher than for propachlor. Use harrow or rotary hoe if weeds emerge before rainfall received. Rates are 2½ to 4 qt/A. The lower rates have been satisfactory in most SDSU tests.

### DUAL + ATRAZINE (METOLACHLOR + ATRAZINE)

#### BICEP

1½-2 pt Dual-8 lb/gal + 1-1½ qt atrazine-4 lb/gal or 1½-2 lb atrazine-80% wp or 1.1-1.7 lb AAtrex-90% wdg

2.4-3.2 qt Bicep-2½ + 2 lb/gal

Grain sorghum treated with Concep (safener). Not for lister planted sorghum. Very good control of several annual grasses and several small-seeded annual broadleaves such as pigweed, kochia, and lambsquarters. Limited control of large-seeded annual broadleaves such as sunflower. Improves broadleaved control compared to Dual alone. Severe stand reduction with untreated seed. Seed must be treated with Concep (safener) by the seed company. Tests indicate very good crop tolerance to Dual when using treated seed; fair tolerance to lower atrazine rate in combination. Crop injury may occur under cool, wet conditions or on alkaline or calcareous soils or with higher rates. Use only on medium or heavy textured soils with over 1.5% organic matter. Rates of 2 (metolachlor) + 1 (atrazine) lb/A active are suggested for most heavier soils. Tank-mix preferred as it allows flexibility for reduced atrazine rates if carryover must be minimized. Lower atrazine rates improve crop tolerance.

Bicep suggested only for heavy soils where corn will be planted the following year. Tank-mix or use commercial premix containing 2½ lb metolachlor + 2 lb atrazine per gallon. May be applied in liquid fertilizer. Minimum carrier is 10 gpa for ground or 2 gpa for air. Refer to atrazine section for carryover crop limitations. Good broad spectrum, late season control if atrazine does not interfere with crop rotation.

SHALLOW PREPLANT INCORPORATED. Incorporate as for Dual alone. Will give more consistent weed control in major sorghum area but slightly less crop tolerance than preemergence especially with higher atrazine rates.

PREEMERGENCE. Same as for Dual alone.

### LASSO + ATRAZINE (ALACHLOR + ATRAZINE)

#### LASSO/ATRAZINE

2-3 qt Lasso-4 lb/gal + 3/4-1 3/4 qt atrazine-4 lb/gal or 1-2 lb atrazine-80% wp or .8-2 lb atrazine-90% wdg.

3.5-4.5 qt Lasso/atrazine-2½+1½ lb/gal

Grain sorghum treated with fluorozole (Screen) safener. Tank-mix or commercial premix containing 2½ lb alachlor + 1.5 lb atrazine per gallon. Not for lister planted sorghum. Very good control of several annual grasses and several annual broadleaves such as pigweed, kochia and lambsquarters. Limited control of large-seeded broadleaves such as sunflower. Severe stand reduction with untreated seed. Seed must be treated with safener by the seed company. Very good crop tolerance with safened seed. Crop tolerance best to lower atrazine rate. Crop injury may occur under cool, wet conditions or on alkaline or calcareous soils when using higher rates. Not for sandy soil. Rates of 2 (alachlor) + 1 (atrazine) lb/A active are suggested for most soils. Tank-mix allows flexibility. Carryover may affect atrazine sensitive crops. Minimum carrier is 10-15 gpa for ground or 3 gpa for air. May be applied in liquid fertilizer.

SHALLOW PREPLANT INCORPORATED. Incorporate as for Lasso alone. Will give more consistent control in major sorghum area but slightly less crop tolerance than preemergence with high atrazine rates. Use 1 pt/A more Lasso than for preemergence application in tank-mix.



## SORGHUM HERBICIDES (CONTINUED)

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### RAMROD + BLADEX (PROPACHLOR + CYANAZINE)

3.6-6 lb Ramrod-65% wp + 1.2-2 lb Bladex-80% wp

Current label includes wettable powder formulations only. Rates of 2 1/3-4 qt Ramrod-4 lb/gal + 1-1 1/2 qt Bladex-4 lb/gal are equivalent to the wettable powder rates listed and can apparently be used. Do not use on sandy soil. No carryover. Minimum carrier is 20 gpa. May be applied in liquid fertilizer. Do not graze or feed forage to dairy cattle

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### LASO + MODOWN (ALACHLOR + BIFENOX)

2-3 qt Lasso-4 lb/gal + 1 1/4-1 2/3 qt Modown-4 lb/gal

Grain sorghum treated with fluoroazole (Screen) safener. Tank-mix. Good control of annual grasses. Very good to excellent control of pigweed and fair to good control of kochia and lambsquarters. Good combination where pigweed is a major problem and carryover must be avoided. Less sensitive to soil variation than other combination treatments. Do not apply after sorghum breaks the soil. Rainfall at time of emergence may cause injury. Use high rate for heavy soil. Rates of 2-2 1/2 (alachlor) + 1 1/2 (bifenox) lb/A active are suggested for most soils. May be applied in liquid fertilizer. No carryover.

PREEMERGENCE. Same as for Lasso alone.

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### ATRAZINE + CROP OIL

1 1/2 qt atrazine-4 lb/gal or 1 1/2 lb atrazine-80% wp or 1 1/3 lb Aatrex-90% wdg + crop oil

Grain sorghum, forage sorghum, and sorghum-sudan hybrids. Very good to excellent control of annual broadleaved weeds. Not intended for grass control.

EARLY POSTEMERGENCE. Apply after crop is in 3-leaf stage. Broadleaves should be less than 4 inches high. Fair crop tolerance. Greatest risk is on lighter, low organic matter soil and under wet, cold conditions. Stands can be reduced. Do not use on sandy soil. Use 1 gal/A crop oil or 1 qt/A or oil concentrate for ground or 2 qt/A crop oil for air. Minimum carrier is 10 gpa for ground or 2 gpa for air. Do not use liquid fertilizer carrier. Refer to atrazine section for carryover crop limitations.

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### 2,4-D

1 pt 2,4-D amine-4 lb/gal or 1/2 pt 2,4-D ester-4 lb/gal or 1/3 pt 2,4-D ester-6 lb/gal

POSTEMERGENCE. Grain sorghum. For annual or perennial broadleaf control. Very good control of several annual broadleaves such as sunflower or Russian thistle. Erratic on pigweed under dry conditions. Poor on kochia. Fair crop tolerance. Most risk of injury with wet, warm weather and rapidly growing crop. Considerable differential varietal tolerance. Performance data on varieties not generally available. Growing conditions often affect relative sensitivity. Maximum rates are listed above, and are for most situations. Small, sensitive weeds may be controlled by lower rates. This reduces injury risk. Some labels provide for higher rates to improve perennial weed (field bindweed) control; however users must assume increased injury risk.

Apply when crop is 5 to 12 inches high from soil to tip of whorl leaf. Earlier treatments may inhibit root development and cause lodging; later spraying may cause poor seed development. Use drop nozzles after the crop is 8 inches high to minimize injury.

Labels for 2,4-D vary. Few products include forage sorghums. Some labels include applications of 1 lb/A acid equiv. after the dough stage as a harvest aid. Consult product label.

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### BANVEL (DICAMBA)

1/2 pt Banvel-4 lb/gal

POSTEMERGENCE. Grain sorghum. Very good control of annual broadleaves. Has been especially effective on kochia and pigweed. Some perennials may not be emerged at time to treat. Apply before sorghum is 15 inches tall or before 25 days after emergence, whichever comes first. Do not apply over the top after milo is 8 inches tall. Adequate crop tolerance. Injury may be severe with application later than recommended. Follow drift precautions. Minimum carrier is 10 gpa for ground and 3 gpa for air. Do not mix with 2,4-D. Do not harvest forage before mature grain stage.



## OTHER SORGHUM HERBICIDES

### MODOWN (BIFENOX)

2-2½ lb Modown-80% wp or 3-4 pt Modown-4 lb/gal

Grain sorghum. Very good to excellent control of pigweed. Fair to good control of certain other small-seeded annual broadleaves such as kochia and lambsquarters. Not for grass control. Better crop tolerance than for most other soil applied broadleaf herbicides. No carryover. Suggested for use in combination with Ramrod or Bexton. Not recommended alone. Refer to Ramrod or Bexton + Modown section.

PREEMERGENCE. Requires ½-1 inch of rainfall within one week after application.

### MILOGARD (PROPAZINE)

4-4 3/4 pt Milogard-4 lb/gal or 2½-3 lb Milogard-80% wp or 2½-2 3/4 lb Milogard-90% wdg

Grain and forage sorghum. Fair to good control of annual broadleaved weeds. Fair on annual grasses. Weed control is inconsistent. Fair to good crop tolerance. The 2 lb/A active rate has been used in most SDSU tests. Low rates for lighter, low organic matter soils. Do not use on sands. May be applied in liquid fertilizer. Minimum carrier is 20 gpa for 80% wp, 10 gpa for liquid and 20 gpa for 90% wdg in ground equipment. Minimum carrier is 5 gpa for liquid or 1 gal/A for each pound of 80% wp or 2 gpa for 90% wdg. Corn may be planted 12 months after treating. Do not plant other crops for 18 months after application because of carryover.

SHALLOW PREPLANT INCORPORATED. Same as for atrazine alone.

PREEMERGENCE. Rainfall very critical. Generally unsatisfactory results except if rainfall received.

### ATRAZINE

3¼-4½ pt atrazine-4 lb/gal or 2-3 lb atrazine-80% wp or 1 3/4-2½ lb AAtrex-90% wdg

Grain and forage sorghum, sorghum-sudan hybrids. Excellent control of small-seeded annual broadleaves. Good control of large-seeded annual broadleaves. Poor to fair control of annual grasses. Fair crop tolerance on heavy soils. Risk of injury greatest on light, low organic matter soil and under cold, wet conditions. Stands may be reduced. Do not use on sandy soil. Use high rate on heavy, clay, high organic matter soil.

Preplant or preemergence application may be made in liquid fertilizer. Minimum carrier for preplant or preemergence application is 1 qt carrier for each 1 qt of liquid or 1 gal carrier for each pound of wp or wdg.

Corn or sorghum may be planted the following year. Susceptible crops such as soybeans, sunflowers, small grain, or grass/legumes should not be planted the following year. Lower rate used in combinations reduces carryover, but will still cause damage to susceptible crops. Not for furrow-planted crops. Do not graze or feed forage for 21 days after application.

SHALLOW PREPLANT INCORPORATED. Apply within 2 weeks of planting and incorporate into top 2 inches of soil with a field cultivator or shallow disk during final seedbed preparation. Most consistent application method. Reduced rainfall requirement for activation.

PREEMERGENCE. Requires 3/4 to 1 inch of rain within one week of application. Less consistent than preplant. Harrow or rotary hoe if weeds emerge before rainfall received.

EARLY POSTEMERGENCE. Without oil using full rate. Crop completely emerged to 6 inches high. Slightly better crop tolerance but less consistent weed control than other methods unless rainfall received. Minimum carrier is 2 gpa for air or 5 gpa for liquid or 10 gpa for wp or wdg for ground. Postemergence application using lower rate with crop oil preferred.

### RAMROD + LOROX (PROPACHLOR + LINURON)

1-4 3/4 lb Ramrod-65% wp + 2/3-3 lb Lorox-50% wp

Grain sorghum. Tank-mix. Requires 1/2-3/4 inch rain within one week after application. Very good annual grass control and fair to good control of some annual broadleaves. Broadleaf control somewhat inconsistent. Good crop tolerance. Do not incorporate. Use low rate on light, low organic matter soil. Rates of 3-4 (propachlor) + 1 (linuron) lb/A active are suggested for most soils with over 3% organic matter. Propachlor wp may cause skin irritation. No carryover for next season. Minimum carrier is 25 gpa for ground application. Do not graze or feed forage to dairy cattle.



## OTHER SORGHUM HERBICIDES (CONTINUED)

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### RAMROD + MILOGARD (PROPACHLOR + PROPAZINE)

3½-4½ lb Ramrod-65% wp + 1-1 1/3 lb Milogard-80% wp

Grain sorghum. Tank-mix. Very good annual grass control. Fair to good control of several small-seeded annual broadleaves. Less consistent control in major sorghum area than some other combination treatments. May be applied in liquid fertilizer carrier. Minimum carrier is 20 gpa. Refer to sections for Ramrod or Milogard alone. Note carryover crop limitations. Appears to have limited potential for widespread use.

PREEMERGENCE. As for Ramrod or Milogard alone.

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### DUAL + IGRAN (METOLACHLOR + TERBUTRYNE)

1½-2 pt Dual-8 lb/gal + 1½-2 lb Igran-80% wp

Grain sorghum treated with Concep (safener). Not adequately tested. Very good annual grass control expected. Annual broadleaf control better than with Dual alone or with Dual + Milogard, but less than with Dual + atrazine. Slightly better crop tolerance than Dual + atrazine. Seed must be treated with Concep (safener) by the seed company. No carryover. Refer to application directions for Dual alone and to Igran section for performance of Igran. No carryover for next season.

SHALLOW PREPLANT INCORPORATED. Incorporate as for Dual alone.

PREEMERGENCE. Refer to Dual or Igran section.

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### DUAL + MILOGARD (METOLACHLOR + PROPAZINE)

#### MILOCEP

1½-2 pt Dual-8 lb/gal + 1½-2½ lb Milogard-80% wp

3-5 pt Milocep-5 lb/gal

Grain sorghum treated with Concep (safener). Tank-mix or use Milocep commercial premix containing 36% metolachlor (Dual) and 19% propazine (Milogard). Limited data. Slightly less weed control and slightly better crop tolerance than Dual + atrazine. Sorghum seed must be treated by the seed company with Concep (safener).

Use low rate on light, low organic matter soil. Rate of 4 pt/A suggested for most soils. Do not use on sands. May be applied in liquid fertilizer. Minimum carrier for Milocep is 15 gpa. Minimum carrier for tank-mix is 10 gpa for ground or 2 gpa for air. Refer to propazine section for carryover crop limitations. Dual + atrazine preferred for most situations.

SHALLOW PREPLANT INCORPORATED. As for Dual alone.

PREEMERGENCE. As for Dual alone.

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### LASSO + MILOGARD (ALACHLOR + PROPAZINE)

2-3 qt Lasso-4 lb/gal + 1-1.3 lb Milogard-80% wp

Grain sorghum treated with fluorozole (Screen) safener. Tank-mix. Limited data. Expected to be less effective than Lasso + atrazine. Sorghum seed must be treated with safener. Not for sandy soil. May be applied in liquid fertilizer. Rotate only to corn or soybeans for 18 months after application.

PREEMERGENCE. Same as for Lasso alone.

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### IGRAN (TERBUTRYN)

2-3 lb Igran-80% wp

PREEMERGENCE. Grain sorghum. Limited tests indicate good control of some annual broadleaves and fair to good control of foxtail when rainfall received. Marginal crop tolerance. Considerable risk of injury on lighter, calcareous or alkali soils or with cool soil temperature or if heavy rain received before crop is 2 inches tall. Minimum soil temperature is 60°F. Apply within 2 days of planting. Minimum carrier is 20 gpa for ground or 5 gpa for air. No carryover for next season.

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## OTHER SORGHUM HERBICIDES (CONTINUED)

### IGRAN + ATRAZINE (TERBUTRYN + ATRAZINE)

2-2½ lb Igran-80% wp + 1 pt atrazine-4 lb/gal or 1 lb atrazine-80% wp

**PREEMERGENCE.** Grain sorghum. Tank-mix. Limited to heavy soils. Limited tests. Good broadleaf control but less grass control and less crop tolerance than some other combinations. Appears to have limited potential in major sorghum areas. Refer to Igran section. See atrazine section for carryover crop limitations.

### IGRAN + MILOGARD (TERBUTRYN + PROPAZINE)

2-2½ lb Igran-80% wp + ½ lb Milogard-80% wp or 1 pt Milogard-4 lb/gal

**PREEMERGENCE.** Grain sorghum. Tank-mix. Slightly better crop tolerance than for Igran + atrazine combination. Limited tests. Fair to good broadleaf control, but less grass control and less crop tolerance than some other combinations. Appears to have very limited potential. Refer to Igran section. Refer to Milogard section for carryover crop limitations.